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WHAT IS CLAIMED IS:

1. A method for determining a patient's blood oxygen transport and lipid level, comprising the steps of:
obtaining a blood sample from the patient;
measuring a rate of oxygen diffusion across a membrane of a red blood cell of the blood sample; and
correlating the measured rate with established levels of blood lipid to determine the patient's blood lipid level.
2. The method of claim 1, wherein the step of measuring comprises:
exposing the red blood cell to oxygen;
exposing the red blood cell to an environment depleted of oxygen; and
monitoring either a blood level of oxygen, a level of oxygen bound to hemoglobin, or both.
3. The method of claim 2, wherein exposing the red blood cell to oxygen comprises circulating a blood sample in a closed loop diffusion chamber, the chamber housing an atmosphere comprising oxygen.
4. The method of claim 3, wherein the atmosphere comprising oxygen comprises atmospheric gas pressures.
5. The method of claim 4, wherein the gas pressures comprise about 160 mm Hg O₂ and about 4 mm Hg CO₂.
6. The method of claim 3, wherein the atmosphere comprising oxygen comprises capillary gas pressures.
7. The method of claim 6, wherein the gas pressures comprise about 23 mm Hg O₂ and about 46 mm Hg CO₂.
8. The method of claim 3, wherein circulating lasts for about 6 min.

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9. The method of claim 2, wherein exposing the red blood cell to an environment depleted of oxygen comprises circulating a blood sample in a closed loop diffusion chamber, the chamber housing an atmosphere comprising nitrogen and depleted of oxygen.

10. The method of claim 9, wherein the atmosphere is supplied from a container of commercial grade nitrogen gas.

11. The method of claim 9, wherein circulating lasts for about 15 min.

12. The method of claim 2, wherein the step of exposing the red blood cell to oxygen precedes the step of exposing the red blood cell to an environment depleted of oxygen.

13. The method of claim 2, wherein the step of exposing the red blood cell to an environment depleted of oxygen precedes the step of exposing the red blood cell to oxygen.

14. The method of claim 1, wherein the measuring step is performed on a whole blood sample comprising anticoagulant.

15. An apparatus for measuring diffusion of oxygen across a red blood cell membrane comprising an oxygen level detector, a gas exchange system, and a red blood cell transport system;

the red blood cell transport system being adapted and configured for transporting a fluid containing red blood cells through the gas exchange system and the oxygen level detector;

the gas exchange system being adapted and configured to exchange a gas with the fluid containing the red blood cells at a rate faster than the rate at which the gas diffuses across a membrane of the red blood cell;

the oxygen level detector being adapted and configured for detecting oxygen levels in a red blood cell or in fluid surrounding a red blood cell.

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16. The apparatus of claim 15, wherein the oxygen level detector comprises an oxygen electrode.

17. The apparatus of claim 15, wherein the oxygen level detector comprises a spectrophotometric detector.

18. The apparatus of claim 15, wherein the oxygen level detector comprises a fluorometric detector.

19. The apparatus of claim 15, wherein the gas exchange system comprises a closed loop diffusion system; the closed loop diffusion system comprising a gas permeable tubing and a housing; the gas permeable tubing having a lumen effective for containing red blood cells; the housing being adapted and configured for containing successive samples of gases.

20. The apparatus of claim 15, wherein the red blood cell transport system comprises a pump.

21. The apparatus of claim 20, wherein the pump is a peristaltic pump.

22. The apparatus of claim 15, wherein a cartridge-type insert and the red blood cell transport system comprise a gas permeable tubing, the gas permeable tubing being arranged and configured to exchange a gas with a fluid containing red blood cells; the cartridge-type insert being arranged and configured for inserting into the apparatus, removing from the apparatus, and disposal.

23. The apparatus of claim 15, wherein a modular system and the red blood cell transport system comprise a receiving and diffusion system, the receiving and diffusion system being arranged and configured to exchange a gas with a fluid containing red blood cells; the modular system insert being arranged and configured for inserting into the apparatus, removing from the apparatus, and disposal.

24. A method for determining a patient's susceptibility to angina, comprising the steps of:

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obtaining a blood sample from the patient;
measuring a rate of oxygen diffusion across a membrane of a red blood cell
of the blood sample; and
correlating the measured rate with the susceptibility to angina observed in a
control population, or in the patient, at the measured rate.

25. The method of claim 24, wherein the step of measuring comprises:
exposing the red blood cell to oxygen;
exposing the red blood cell to an environment depleted of oxygen; and
monitoring either a blood level of oxygen, a level of oxygen bound to
hemoglobin, or both.

26. A method for determining the effectiveness of a lipid-lowering
therapy, comprising the steps of:
obtaining a blood sample;
measuring a rate of oxygen diffusion across a membrane of a red blood cell
of the blood sample;
correlating the measured rate with established levels of blood lipid to
determine the patient's relative or absolute blood lipid level; and
comparing the patient's lipid level to the patient's previous lipid level.

27. The method of claim 26, wherein the step of measuring comprises:
exposing the red blood cell to oxygen;
exposing the red blood cell to an environment depleted of oxygen; and
monitoring either a blood level of oxygen, a level of oxygen bound to
hemoglobin, or both.

28. A method for determining a patient's blood oxygen transport,
comprising the steps of:
obtaining a blood sample from the patient; and
measuring a rate of oxygen diffusion across a membrane of a red blood cell
of the blood sample.

29. The method of claim 28, wherein the step of measuring comprises:

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exposing the red blood cell to oxygen;
exposing the red blood cell to an environment depleted of oxygen; and
monitoring either a blood level of oxygen, a level of oxygen bound to
hemoglobin, or both.

30. The method of claim 29, wherein exposing the red blood cell to
oxygen comprises circulating a blood sample in a closed loop diffusion chamber, the
chamber housing an atmosphere comprising oxygen.

31. The method of claim 29, wherein exposing the red blood cell to an
environment depleted of oxygen comprises circulating a blood sample in a closed
loop diffusion chamber, the chamber housing an atmosphere comprising nitrogen
and depleted of oxygen.

32. The method of claim 29, wherein the step of exposing the red blood
cell to oxygen precedes the step of exposing the red blood cell to an environment
depleted of oxygen.

33. The method of claim 29, wherein the step of exposing the red blood
cell to an environment depleted of oxygen precedes the step of exposing the red
blood cell to oxygen.

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